Charm
LUMinator® T
Operating Instructions

New Version 6.12!
Added Features include:

- **Charges with AC adapter (internal charging circuit) with charging LED's**
- **Power Save option**
- **Improved battery charge indicator**
- **Replaceable battery pack**

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1. INTRODUCTION

The Charm LUMinator T® (LUM-T) is a portable analyzer for multiple Charm Lite Series Tests (luminescent assays). The LUM-T detects light to interpret assay results, and works in conjunction with the Charm Lite Series Tests including the PocketSwab® Plus (ATP sanitation/hygiene); PasLite (alkaline phosphatase); CHEF Test (cooking heat efficiency); SomaLite (somatic cell); CideLite (pesticides); and Microbial Quality of Water and Wine. The LUM-T also has a reader-adapter option for the Charm ROSA™ Tests, which allows residue testing for Beta-Lactams (SL and MRL Tests), Sulfamethazine and Sulfadimethoxine, Tetracylines, Aflatoxins, and Enrofloxacin. The LUM-T is capable of statistically analyzing, storing and sorting assay data in its memory, and at a later time, transferring this information to the display, a printer, or a computer system. This allows for on site sample testing, and hard copy printouts or computer data management at another location and time.

2. GENERAL FEATURES

2.1 FUNCTION KEYS

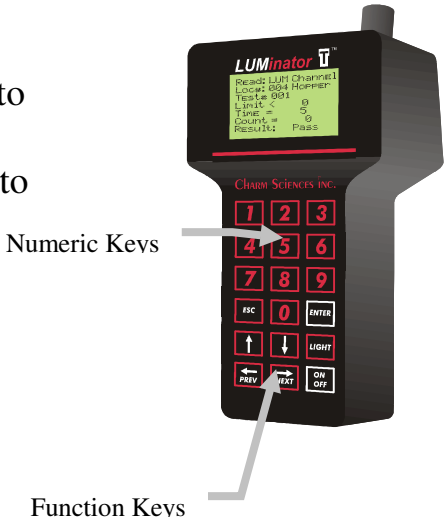
The LUM-T uses a set of 8 function keys and 10 numeric keys (illustrated below):

ON/OFF: powers up/down the analyzer.

ENTER: starts the operation that is currently displayed on the readout, or may be used to select a displayed command. The ENTER button is also used to implement changes to preset values.

ESC: cancels whatever function is being performed. ESC is used to return to a previous menu.

LIGHT: activates/deactivates the back light for an adjustable period (see Setup Menu). Shorter times will extend battery life. (Note: Pressing any button will activate the backlight for the preset period as well).



↑	moves the blinking cursor **up**, and scrolls through data in **Results Menu**
↓	moves the blinking cursor **down**, and scrolls through data in **Results Menu**
→ **NEXT**	moves the blinking cursor to the **right***
← **PREV**	moves the blinking cursor to the **left***

* In **READ:…ASSAY** mode, scrolls through location names and numbers. In the **Display By** and **Delete** fields of the **Results Menu**, these keys are not used. The ENTER key serves this function after the desired numbers have been typed in.

Numeric Keys:
Used to enter sample location number, test number, or date. Entries by numeric keys should normally be followed by ENTER, ↑, or ↓.

2.2 CHARGING THE BATTERY

The Charm LUM-T is powered by an internal rechargeable battery pack, or an AC to DC power supply. To charge the battery unit before use, turn the power off (display goes blank), and connect the AC adapter. Plug the adapter into a suitable outlet. The green LED on the bottom of the LUM-T indicates that power has been applied to the system and the battery is being tested. There is no risk of reducing battery life by plugging the analyzer in when the battery is only partially depleted, but it may extend charge time.

When the green LED blinks fast, the battery is charging. When the green LED blinks slowly, the battery is fully charged and can be unplugged. Charging a fully depleted battery takes between 2 and 4 hours. If the LED blinks red, the battery pack is not functioning and must be replaced. Contact Charm Sciences for information on replacement.

Battery Charge Indicator:

A battery charge symbol is displayed in the upper right-hand corner of the screen, showing how much power is left in the rechargeable battery. As the battery power decreases, the level of charge in the symbol goes down. This indicator is visible on all screens except when a test is in progress.

The charge indicator

Fully charged battery

Low charge in the battery

(blinking) Battery charge depleted (charge immediately)

(blinking) Charging

(blinking alternately) Fully charged battery, analyzer is plugged in

The LUM-T may be operated from AC power as it is being recharged. When the battery charge is low, if the battery is not recharged immediately, the LUM-T will operate a short time before automatically shutting off. Disconnect the LUM-T from the power cord when full charge is indicated.

For optimum battery performance and life, deplete the battery charge fully before recharging.

Memory Battery:

An internal battery is used for memory storage. If this battery is low, a flashing "**L_T**" indicator will be displayed in the upper right corner of the LUM-T display. Call Charm Sciences technical support for further instructions.

3. OPERATIONS

3.1 READ: ... Channel SCREEN

When powered up, the LUM-T defaults to READ: LUM Channel for PocketSwab Plus™ analysis:

```
READ: LUM  Channel

Loc   001  Filler #6
Test: 001
Limit <           0
Time  =           0
Count =           0
```

1. Cursor will blink on the **Loc** to be entered. **Loc** is the area location number to be tested, or sample identification. To enter a **Loc** other than that displayed, use numeric keys (1-999) to choose the correct location, and press ↓ to move to the next field or press ENTER to start count. The location description (see section 6.4.3) will be displayed to the right of the **Loc**. Each time the LUM-T is powered on the **Loc** and **Test:** reset to "1" = `001`. **Loc** will automatically increase by 1 with each test run.
2. **Test:** can also be adjusted. If more than one test is done on the same location, the **Test:** can be used to indicate the 2nd, 3rd, 4th, ...999th re-test. Each time the **Loc** changes, the **Test:** resets to "1" = `001` (default setting for multisite naming, Section 6.3.1). To change the **Test:** press ↓ after selecting the correct **Loc**, and enter the appropriate re-test number.
3. When information displayed on the screen is satisfactory, prepare sample(s) according to the assay procedure. Insert the test unit (for example, a PocketSwab Plus), and press ENTER to begin counting. The test unit must be fully inserted for proper reading.
4. The sample Relative Light Unit (RLU) will appear as the **Count =**. The RLU is compared to the **Limit to** determine the **Result:** Pass or Fail. All information is automatically stored to memory.

3.2 CHARM LUM-T MICROTUBE ADAPTER

The Microtube adapter allows the use of standard microtubes in a Charm LUM-T. The adapter is designed to hold the microtube and to seal the open chamber in one simple step.

Instructions:
Remove cap (if present) from the microtube and screw the microtube into the end of the black adapter. Keep the assembly vertical with the microtube down to prevent any liquid from flowing into the adapter.

The microtube adapter is used in conjunction with the Charm Alkaline Phosphatase, Pesticide, Somatic Cell, and Microbial Quality of Water, Beer and Wine Tests.

Insert the microtube adapter assembly into the LUM-T as shown. Insert fully then press Enter to count.

3.3 READ: …STRIP READER SCREEN

A separate manual covers instructions for connecting and using the Imager with the LUM-T to read ROSA technology test strips.

1. **When LUM-T is being used in conjunction with the Charm ROSA Imager Adapter the following assay screen will be displayed**:

```
READ: CH6 STRIP

Samp#: 001   Loc. 001
Oper : 001
Limit <         0
Time  =         0
Read  =         0
```

   Cursor will blink on Samp#: to be entered. Samp#: is the 3 digit numerical sample ID to represent tanker#, cow#, farm#, etc. To enter a Samp#: other than that displayed, use numeric keys (1-999) to choose the correct location, and press ↓ to move to the next field or press ENTER to start count. The location description (see section 6.3) will be displayed to the right of the Samp#: Each time the LUM-T is powered on the Samp#: and Oper: reset to "1" = 001. Samp#: will automatically increase by 1 with each test run.

2. **Oper:** can also be adjusted. If more than one operator is using the LUM-T, the **Oper:** can be used to indicate a 3 digit numerical operator ID. Each time the **Samp#:** changes, the **Oper:** resets to "1" = `001`. To change the **Oper:** press ↓ after selecting the correct **Samp#**, and enter the appropriate operator ID.

3. When information displayed on the screen is satisfactory, prepare sample(s) according to the assay procedure. Insert the test unit (for example, a Charm SLBL test), and press ENTER to begin counting. The test unit must be fully inserted for proper reading.

4. DISPLAY SETTINGS

4.1 MAIN MENU

The Main Menu is the only screen where all functions of the Luminator can be accessed. The Read, Results, Customer Settings, Factory Settings, Statistics, and Remote Mode Menus can be accessed through this screen. Below is a description of each individual menu and its functions.

4.2 READ SAMPLE MENU

If a sample is to be read on a channel other than **LUM Channel**, press ESC once after power up to return to the **Read Sample** menu, and select from the following assay channels:

1) LUM - Channel to count assays in Relative Light Unit (RLU) units of measure. Assays include: PocketSwab Plus™ and PocketH2O
2) CH 2* - Open channel to be used with customized assays.
3) CH 3* - Open channel to be used with customized assays.
4) CH 4* - Open channel to be used with customized assays.
5) CH 5* - Open channel to be used with customized assays.
6) CH 6* - Open channel to be used with customized assays.

* **CH2-CH6** can be customized for use with the LUM assays, AP and CHEF assays, Somatic CELL assay, Pesticide assay or the Charm ROSA Imager.

Use ↑ and ↓ and press ENTER or use numeric keys to select desired assay. **READ**: [Channel Selected] **Channel** menu will appear (see Section 3.1).

4.3 RESULTS MENU

4.3.1 MEMORY

The LUM-T is equipped with memory that can store up to 4800 sets of sample information. Every time a test is run, the assay data is saved to the analyzer's memory. Assay data stored includes: Date, Time, Loc/Samp #, Test/Oper, Assay Type, Limit, RLU Count and Result. Once the data is stored in memory, it may be specifically recalled by Date, Time, Assay, Loc/Samp #, and/or Test/Oper, and sent to the analyzer's display, a 32 column printer, or a computer spreadsheet program for data management. The following selections are used for data viewing in the Results Menu.

1) Display By: Designates data points to be retrieved. Must be reset every time reviewing is desired.

2) To Screen: Allows the operator to scroll through selected data chronologically on the LUM-T display.

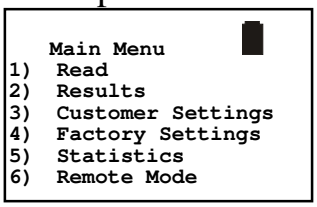
3) To Printer: Connect LUM-T to the accessory printer and get a hard copy of selected test information.

4) To Computer: Connect LUM-T to a computer system and transfer selected assay data to a spreadsheet program. Downloaded data may be modified and saved for long-term storage.

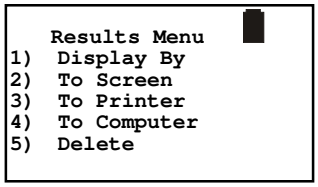
5) Delete: Deletes data from the analyzer's memory.

To view data from the analyzer's memory, follow these steps:

1. Press ESC until **Main Menu** appears.



2. Select **2) Results**. The **Results Menu** will appear:

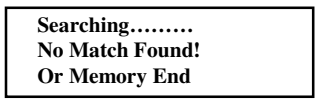


3. Select **1) Display By**.
4. **<u>To review data based on Date and Time only</u>**:
   Data will be recalled starting at the closest data point prior to the date and time set in the **Display By:** screen. Set the date and time to the earliest point at which data is to be recalled. Use PREV and NEXT keys to scroll through the month field. Leave the Assay, Loc, and Test set at "000" to review *all* previously tested data points.

   <u>To review a specific Assay, Loc/Samp # , and/or Test/Oper:</u>
   Data from the current Date and Time back to the earliest test run will be recalled; only for the Assay, Loc/Samp #, and/or Test/Oper displayed. Do not change the current Date and Time settings and designate the desired Assay, Loc/Samp #, and/or Test/Oper to be reviewed. To make changes, move the blinking cursor to the area of interest and enter the desired number. Once a number is changed, press ENTER to move to the next input field.

5. Once desired display values have been entered, press ESC to return to the **Results Menu**. Choose **2) To Screen**. Use ↑ and ↓ to toggle through results.

6. When the following message appears:



   No more information is available. Use the arrow keys to scroll back to previously viewed assay results, or press ESC to return to the results menu.

4.3.2 PRINT DATA

After counting an assay, the LUM-T displays Channel, Loc, Test, Limit, Time, Count and Result. To get a hard copy of this data each time an assay is performed, connect a printer and the information will be printed automatically when a sample is read. To select the printout type, follow these steps:

1. Press ESC until **Main Menu** appears.
2. Select **3) Customer Settings** … press the **Next** button to get to **Pg2**.
3. Select **1) Change Page Other**.
4. Enter Password (See Section 4.4).
5. Find **Printout Type** and select **000000, 000001** or **000002**. Examples of the two printout types can be found below.

Print Option 0

```
Loc#=  2, 14:35:10, LUM = 0
```

Print Option 1

```
Date 01-May-2003 Time 14:32:10
Lot#/Oper = ……
Loc.      1    Kettle
Test:          =          1
LUM Count  =        349
Limit          <          0
Result         =  Fail
```

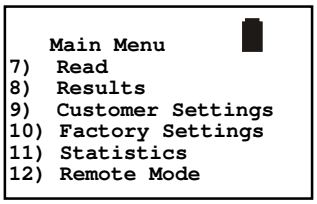
Print Option 2

```
01-May-2003 Test# Loc.#  Count
14:32:10          1      36     349
LUM    Kettle 1        Fail
```

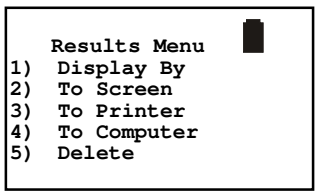
Printer options are only available when printing directly to a printer. When downloading results to a printer, a printout similar to Printout Type 000001 is the default print setting. This default cannot be changed.

To download data from memory to a printer follow these steps:

1. Be sure a printer is connected to the LUM-T with the provided PRINTER adapter.
2. Press ESC until **Main Menu** appears.



3. Select **2) Results**. The **Results Menu** will appear:



4. Select **1) Display By**
5. **To Print data based on Date and Time only:**

   Data from tests run after the date and time set in **Display By**: screen will be printed. Set the date and time to the earliest point at which data is to be printed. Use PREV and NEXT keys to scroll through the month field. Leave the Assay, Loc/Samp #, and Test/Oper set at "000" to print *all* previously tested data points.

   To Print data from a specific Channel, Loc and/or Test:

   Data from tests run after the date and time set in **Display By**: screen will be printed. Set the date and time to the earliest point at which data is to be printed. Designate the desired Assay, Loc/Samp #, and/or Test/Oper to be printed. To make changes, move the blinking cursor to the area of interest and enter the desired number. Once a number is changed, press ENTER to move to the next input field.
6. Once desired display values have been entered, press ESC to return to the **Results Menu**. Chose **3) To Printer**.
7. When all information is sent to the printer the analyzer will return to the **Results Menu.**

4.3.3 MEMORY FULL

The LUM-T can store up to 4800 sets of assay information in its memory. When the analyzer's memory is nearing capacity, a warning message will appear every time an assay is run. When only 100 memory locations are available the following message appears:

WARNING
MEMORY ALMOST FULL
Download & Delete Some or All Data

XX Data Points Left

If test #4801 is attempted a "Memory Full" error message will be displayed. If test #4801 is actually run the LUM-T cannot accept any more information and will lock-up. If this occurs, call Charm Sciences.

ERROR **MEMORY FULL** **Download & Delete** **Some or All** **Data**

To clear the memory, 1) follow instructions in section 5.1 for Data Downloading, and 2) delete data from the LUM-T memory by following these steps:

1. From the **Main Menu** choose **2) Results**.
2. Select **5) Delete**.
3. The password for deletion is factory-set as "4000"
4. Enter the current Date and Time to delete *all* data from the analyzer's memory. Use PREV and NEXT keys to select the month. Day, month and year must all be entered. To save some of the data, enter a cutoff Date and Time. The LUM-T will delete all data *up to* (but not including) this date and time
5. Press ESC once. At the prompt press ENTER to confirm the deletion, or press ESC to abort the deletion. When completed the program will return to the **Results Menu.**

4.4 CUSTOMER SETTINGS

The LUM-T allows for changes in many of its parameters to custom fit assay analysis. *Operators should become familiar with these functions*. A password is required for all changes. The password for **Customer Settings** is factory set at "4000". To get to **Customer Set Menu** press ESC to get to the **Main Menu**. Then, select **3) Customer Settings**.

Note: **4) Factory Settings Menu** is used only for Charm Sciences factory calibration. Do not change factory setting without consulting Charm Sciences. The password for this option is different from the **Customer Set Menu**. The only customer setting that is accessed through the Factory Settings Menu is the Power Save option ("On Time": the amount of time before the LUM-T automatically shuts itself off to conserve battery life). Factory default for this setting is 60 minutes. Contact Charm Sciences for instructions on changing this option.

4.4.1 MENU GUIDELINES

There are two pages of the **Customer Settings Menu**, **Pg1** denotes the first page and **Pg2** denotes the second. The NEXT and PREV buttons may be used to

toggle from page to page. To change any item(s), select the item, type in the new data, and press ENTER to move to the next item on the list. When all changes have been entered, press ESC to exit the Customer Settings Menu and accept all the changes. **CH2-CH6** may be renamed by the operator (see **6.2 Renaming Custom Channel**) and used for custom assay analysis.

Pg1

1) LUM - Allows customer to set background, correction, count time, limit and > or < limit interpret for the LUM channel.

2) CH2 - Allows customer to set background, correction, count time, limit and > or < limit interpret for the CH2 channel.

3) CH3- Allows customer to set background, correction, count time, limit and > or < limit interpret for the CH3 channel.

4) CH4 - Allows customer to set background, correction, count time, limit and > or < limit interpret for the CH4 channel.

5) CH5 - Allows customer to set background, correction, count time, limit and > or < limit interpret for the CH5 channel.

6) CH6- Allows customer to set background, correction, count time, limit and > or < limit interpret for the CH6 channel.

7) Date/Time - Allows customer to set or change the date and time.

Pg2

1) Change Page Other - Allows customer to change pre-established settings for several analyzer functions:

Backlight time - sets duration of display backlight in seconds. The analyzer must be powered down and restarted before the new time will be activated.

Use Loc. Names - allows location names to be alphanumeric or numeric only (See **6.4.1 Renaming a Location**).

Reset Test Num - allows default **test:** to be 1 or previous **test:** number (See **6.3 Renaming the "Test" Line**).

Global Locs. - allows universal customization of 300 location names over all 6 channels, or limits customization of 50 location names per channel (See **6.4.2 Renaming a Location**).

Change Passwd1 - allows password to be changed from default "4000" to any 4 digit number.

Printout Type - allows customer to select one of three styles for the hard copy printout.

2) Printout Settings - Allows customer to get a hard copy of all current parameters (a printer must be properly connected).

4.4.2 SETTINGS GUIDELINES

To change any of the LUM-T operational parameters, follow these steps:

1. Press ESC until **Main Menu** appears. Select **3) Customer Settings**. Select the channel setting to be modified. Enter the password "4000" to get to **Change Settings Menu**. (Menu shown is LUM Channel. Your numbers may differ.)

```
Change Settings:
LUM Limit         000000
LUM >or< Limit    000000
LUM Reader        000000
LUM background    002300
LUM correction    000346
LUM count time    000005
```

Change Settings Menu

Background - The LUM-T subtracts the preset background value from the detected RLU value to display an actual RLU value in the resulting "**count =**" display.

The LUM channel is factory set for maximum sensitivity for a clean stainless steel surface. Any sanitized non-porous surface will read 0 when tested with a PocketSwab Plus.

Channels may be adjusted for less sensitivity by increasing the background. This could be useful for porous surfaces where 0 RLU is difficult to achieve. The additional background of a porous surface can be determined by reading 6 PocketSwabs on an acceptably clean surface. The additional background average should be doubled and added to the existing background to determine the new setting. The channel is then customized for that particular surface to read 0 at acceptable cleanliness. (Alternatively, channel limits can be adjusted to accept readings other than 0, see Limit and < or > Limit.) If background exceeds 9999 a correction factor adjustment is needed. See below.

Correction - The six channels of the Charm LUM-T are calibrated to give readouts in specified units of measure for assay channels listed below. The calibration is based on the correction factor (a slope adjustment) and the background subtract.

Channel customization is based on using known calibration standards to adjust the background subtract and correction factor. Correction factor is

considered a course adjustment while background subtract is a fine adjustment. An example of the LUM channel adjustment follows: For PocketSwab Plus, correction equals RLU of positive / target RLU (=30,000). To adjust the correction, determine RLU of positive/target RLU, and multiply this value by the existing correction factor. This number is the new correction factor. Call Charm Sciences Inc. for additional assistance on these adjustments and applications.

The following channel calibrations are factory set.

LUM Channel - The LUM channel is calibrated in Relative Light Units (RLU). This channel gives a 0 reading for clean stainless steel surfaces on the PocketSwab Plus ATP test. This means that any RLU readings are from the sample and not from background interference.

CH2, CH3, CH4, CH5, CH6: These channels are for custom applications, and are not pre-designated.

Count Time - The factory default time is 5 seconds. Do not change count time unless instructed to do so by Charm Sciences technical support. Longer times may be desirable to reduce assay CV and to eliminate static interference that might occur in very dry locations.

Limit and **> or < Limit** - is the number that determines pass and fail interpretations. If 000000 is selected, all counts > the limit will give a "fail" result, while all counts < or equal to the limit give a "pass" result. If 000001 is selected, the opposite is true. For example:

For PocketSwab Plus, LUM Limit = 000000 and LUM > or < Limit = 000000. This means counts greater than 0 fail.

For Alkaline Phosphatase, AP Limit = 000350 and AP > or < Limit = 000000. This means counts greater than 350 mU/liter of phosphatase activity fail.

The only assay that uses > or < Limit = 000001 is the CideLite test. Numbers greater than or equal to the limit pass, and numbers less than the limit fail.

READER - All channels (except Channel 1) may be programmed for use with the Charm ROSA Imager. Each channel has a default setting of 000000. By changing this to 000001, enables communication with the Charm ROSA Imager.

4.5 FACTORY SETTINGS

The factory settings are custom set by Charm Sciences. These settings consist of specific electrical functions that operate the LUM-T. The password for this menu is different from the Customer Settings Menu.

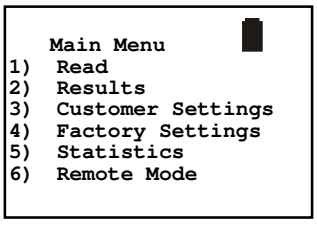
4.6 STATISTICAL ANALYSIS

The LUM-T is equipped with a built in statistical function. Every time a test is run, the assay data is stored in the analyzer's memory and a certain calculation is performed. The following selections can be accessed for statistical analysis using the **Statistics Menu**.

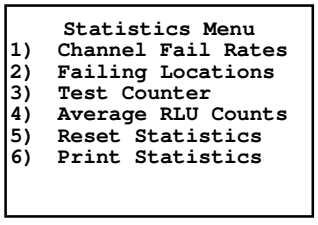
1) **Channel Fail Rates:** Lists all six channels with percentage failure rates.
2) **Failing Locations:** For each channel, lists the 12 character location where highest failure rate occurred. (# failures / # test run)
3) **Test Counter:** Lists the total number of tests performed on each channel.
4) **Average RLU Counts:** Running average of all RLU readings collected for each channel.
5) **Reset Statistics:** Resets all statistics to zero for all channels. The Customer Settings Password must be entered. (See Section 4.4)
6) **Print Statistics:** Sends all current statistical information to a printer or computer. (See Section **5.3 STATISTICS DOWNLOAD**)

To use the statistical feature of the LUM-T, follow these steps;

1. Press ESC until **Main Menu** appears.



2. Select **5) Statistics**. The **Statistics Menu** will appear:



3. Select desired option and results of statistical analysis will be displayed on screen.

4.7 REMOTE MODE

The LUM-T can be attached to a computer to download stored data, customize individual channel names, customize individual locations names, print out internal settings, and erase customizations. (See Section **6. CUSTOMIZING THE LUMINATOR-T**)

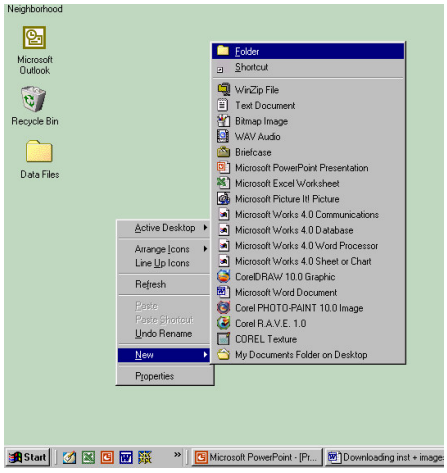
5. COMPUTER COMMUNICATIONS

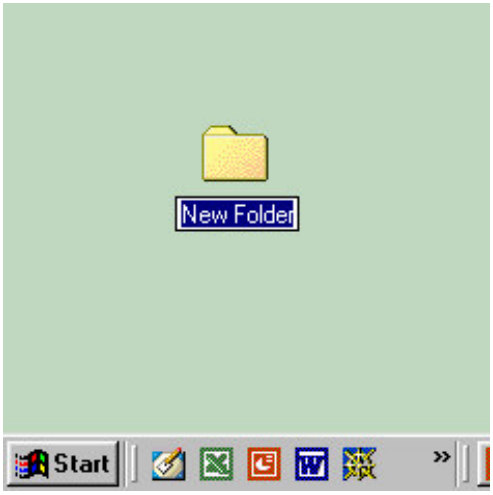
5.1 DOWNLOAD DATA

This section describes options for data downloading using Microsoft HyperTerminal and Excel programs in Windows 95, 98, 2000 and NT. To use other communication or spreadsheet programs, or if using Windows 3.1, contact Charm Sciences for the appropriate instructions.

5.1.1 Establish a downloaded data folder

Right-click on the desktop anywhere there isn't already an icon. Choose "New" and then "Folder". While the new folder name is highlighted, type a name for the folder (i.e. "Downloaded Data").

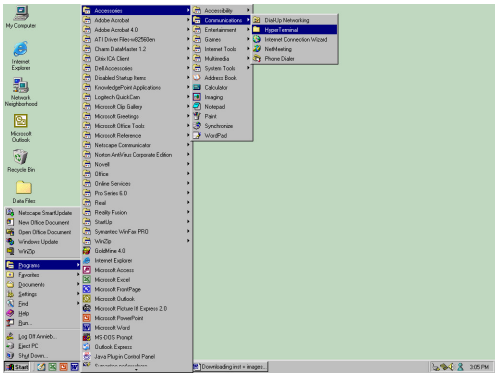




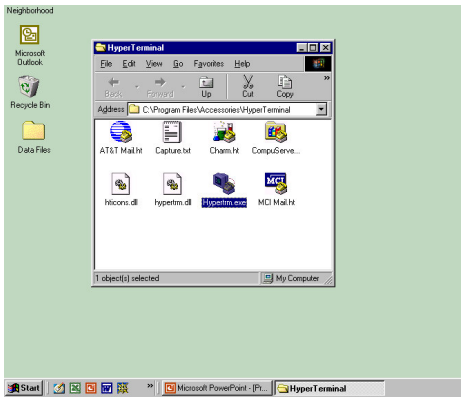
5.1.2 Establish a connection from the analyzer to the computer

Open HyperTerminal from the Start Menu, then choose Programs, then Accessories, followed by HyperTerminal.

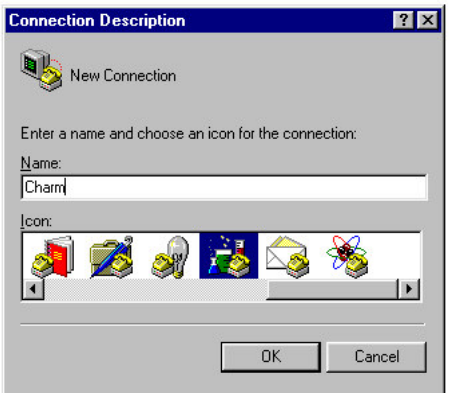
HyperTerminal may also be found in a Communications folder within Accessories, for Win98 and higher.



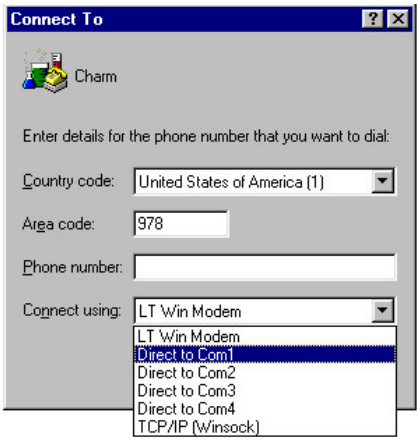
Open “Hypertrm” to set up a connection.



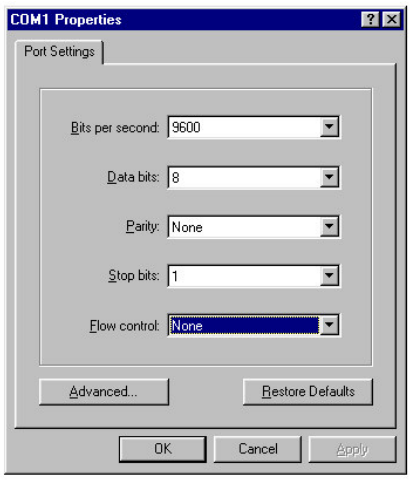
1. In the “Connection Description” window, type in the name “Charm” and choose an icon.



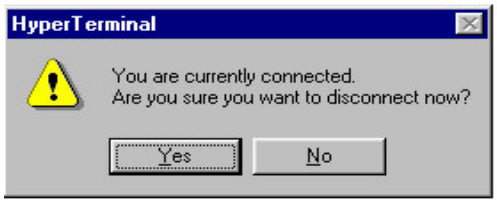
2. In the “Phone Number” window, change the “Connect Using:” setting to “Direct to Com 1”. *Note: if the only available communications port is one other than Com 1, choose the appropriate choice on the “Connect Using” menu.*

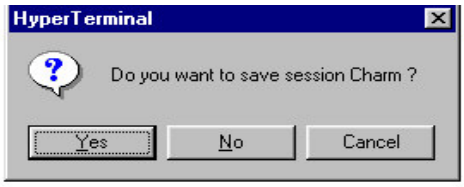


3. In the "COM Properties" window, change the top line ("Bits per second") to be 9600 and change the bottom line ("Flow Control") to be "None"

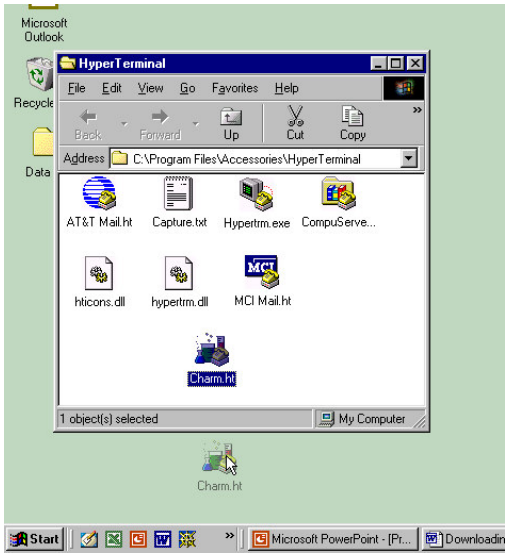


4. A blank white window will appear on the screen. Close this window and click on "Yes" to both messages that appear as the window is closing:





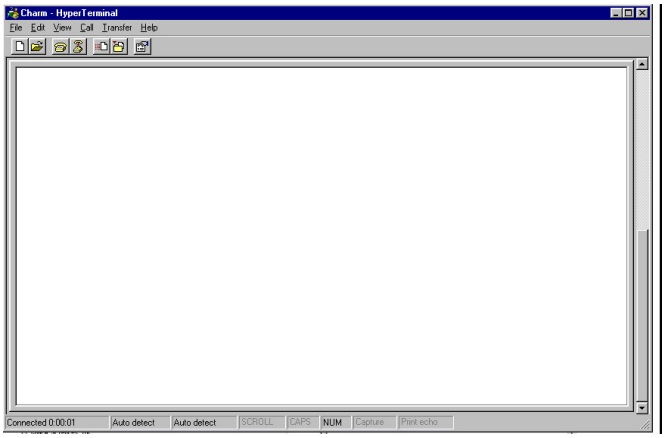
5. A new connection icon will appear in the open HyperTerminal folder after the connection is closed. Right-click and drag this icon to the desktop. Close the HyperTerminal folder.



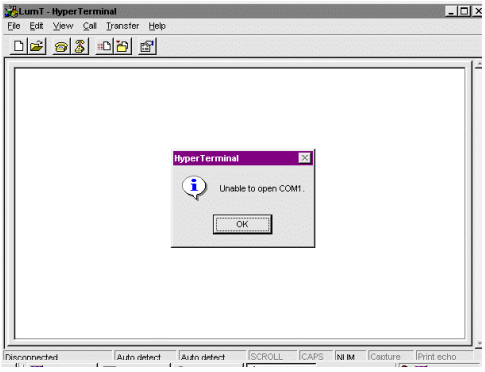
5.1.3 Routine Data Downloading

Connect the analyzer to the black serial communications cable provided by Charm Sciences. Connect the other end of the cable to the RS232 com-port adapter, and plug the adapter into an available communications port on the back of the computer.

1. Double-click on the new icon on the desktop to open the established HyperTerminal connection. A blank white window will appear.

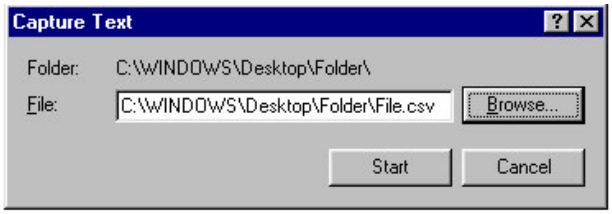


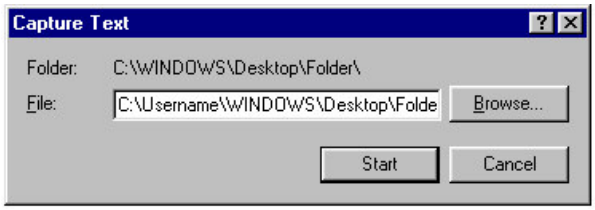
2. Turn on the connected LUM-T. The HyperTerminal window should show a message with "Charm Sciences, Inc." and the analyzer version number. *(If this text does not appear or if the error message "Unable to open Com 1" appears, follow the directions to* Change Communications Port, See Section 5.1.4.)



3. Under the Transfer menu, choose "Capture Text"

4. Enter the file name in the Capture Text window:
    - For Win95 and Win98, the file path should read "C:\WINDOWS\Desktop\" followed by the exact name of the data storage folder established on the desktop (See Section 5.1.1.), ending with the filename and ".csv"
    - For WinNT, the file path should read "C:\WinNT\profiles\username\Desktop\" followed by the exact name of the data storage folder established on the desktop (See Section 5.1.1.), ending with the filename and ".csv"

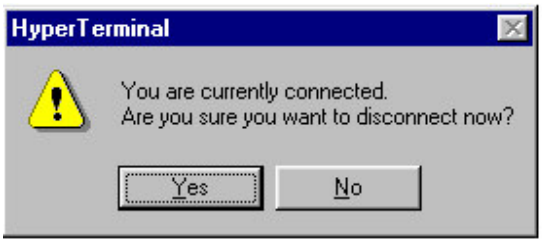




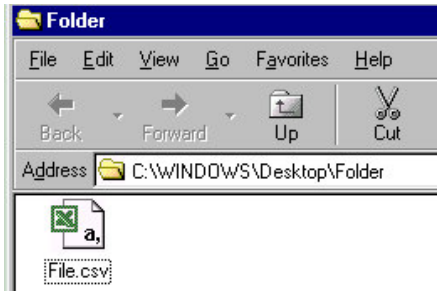
5. Click on the Start button

6. On the analyzer, designate the data to send to the computer:
    6.1. Press ESC until the Main Menu appears.
    6.2. Select **2) Results**.
    6.3. Choose **1) Display By**. Designate the Starting Date and Time that you wish to recall information from. A specific channel, location or test number may be selected using the **Assay, Loc/Samp#** and **Test:/Oper:** options at the bottom of the screen. Remember to press ENTER after a selection is changed.
    6.4. When the desired selections have been made, press ESC.
    6.5 Choose **4) To Computer**, the data will be transferred to the computer. When completed, the analyzer will give a short "Transfer Complete" message, and then return to the Results Menu.

7. Once the data transfer is complete, close the HyperTerminal connection. Click on "Yes" to answer the message that appears:



8. Open the Downloaded Data folder on the desktop and find the file just created. Double-click on this file to open it in Microsoft Excel. *Note: If a message appears asking what program to use to open the file, choose Microsoft Excel. All files of the type ".csv" should open using Excel after this.*



Example of an Excel spreadsheet:

§

Channel	*Date*	Time	Test:	Loc	RLU	Limit	Result
LUM	01-May-2003	07:05:53	1	filler	29894	< 0	Fail
LUM	01-May-2003	07:06:44	2	dischr chute	550	< 0	Fail
LUM	01-May-2003	07:07:04	1	mandrel	0	< 0	Pass
LUM	02-May-2003	07:00:17	1	flow valve 1	0	< 0	Pass
LUM	02-May-2003	07:00:51	1	capper hd	0	< 0	Pass
LUM	02-May-2003	07:08:12	1	line03	0	< 0	Pass
LUM	03-May-2003	07:00:20	1	Conveyorbelt	0	< 0	Pass
RUBR	03-May-2003	07:01:38	1	belt5	2545	< 300	Fail
LUM	03-May-2003	07:02:53	2	hopper	0	< 0	Pass
RUBR	04-May-2003	07:00:09	1	belt5	030	< 300	Pass
LUM	04-May-2003	07:00:31	1	batch tank	0	< 0	Pass

§§

Channel	*Date*	Time	Oper:	Samp#:	Read:	Limit	Result
SLBL	04-May-2003	09:04:19	7	Truck #03	-1512	< 0	Neg.
SLBL	04-May-2003	09:04:39	7	Truck #37	571	< 0	Pos.
SLBL	04-May-2003	09:05:26	7	Truck #142	1864	< 0	Pos.
SLBL	04-May-2003	11:25:50	7	Cow #33	-1491	< 0	Neg.
SLBL	04-May-2003	11:26:14	7	Cow #6754	-1041	< 0	Neg.

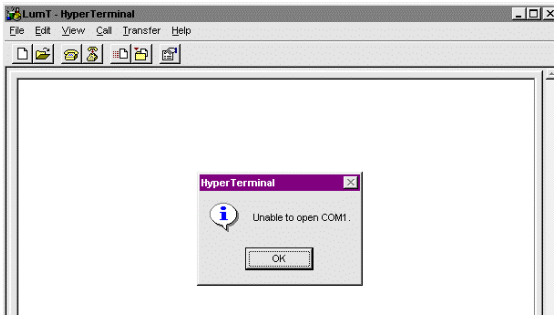
§ Header will not appear when using real time capabilities.

§§ The second row of column headings which appear on the bottom of your download spreadsheet represent data run using the Charm **ROSA Imager** adapter. Real time download is not available with the **ROSA Imager**.

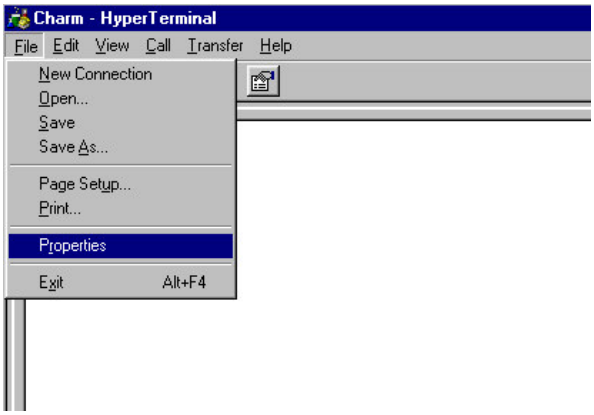
* If there is a problem with the transfer check all connections, make sure the com-port designation is correct, turn off the analyzer and repeat section II. For further assistance, call Charm Sciences Technical Support at (978) 687-9200

5.1.4 Change Communications Port

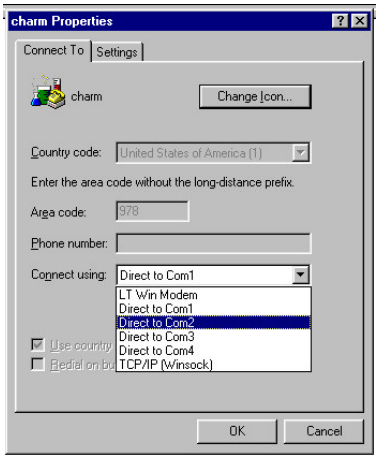
If data does not transfer to the computer or if the error message "Unable to open COM1" appears on the screen, change the connection properties to use another communications port:

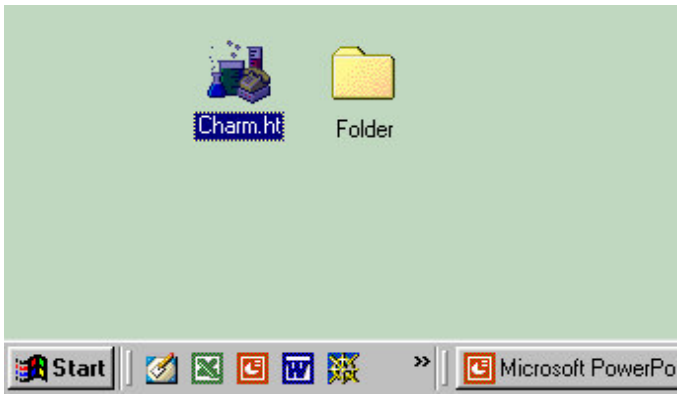


1. Under the File menu, choose Properties



2. In the Properties window, change the "Connect Using" menu to be "Direct to Com 2" (or choose the appropriate communications port number). Click OK and close HyperTerminal. Re-open Hyperterminal from the icon on the desktop and try downloading again. If problems continue, call Charm Technical Services at 978-687-9200.





5.2 REALTIME DOWNLOADING

For Real Time Downloading, follow these steps:

1. Double click on the HyperTerminal icon set up in section 5.1.2.
2. Select **Transfer** … select **Capture Text**.
3. In the "Capture Text" screen, designate a Comma Separated Variable file for the data to be saved to by selecting a file path. (See section 5.1.3 part 4)
4. Connect the LUM-T to the PC and read your tests.
5. When testing is completed, exit HyperTerminal. Double click on the Data folder on the Desktop. Double click on the file, and the data will be displayed in the Microsoft Excel format.
6. Header line will not appear on real time downloads.

5.3 STATISTICS DOWNLOAD

To Send Statistics to the Computer, follow these steps:

1. Double click on the HyperTerminal icon.
2. Connect the analyzer to the PC. Turn on the analyzer and press ESC until the Main Menu appears.
3. Select **5) Statistics** … select **6) Print Statistics**.
4. The current statistical information will be transfer to the computer screen.

5.4 WINDOWS NT

For Windows NT (Helpful Hints)

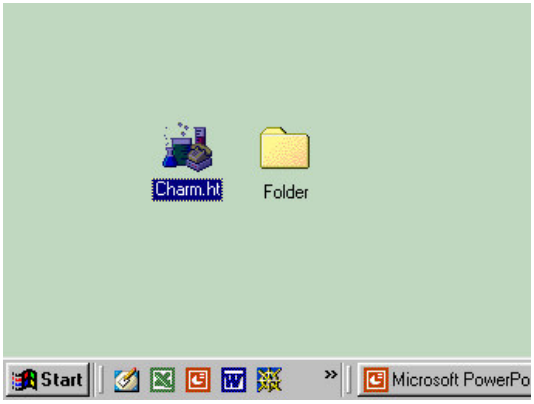
1. Setup HyperTerminal as instructed in Section 5.1.2. In WinNT the new HyperTerminal icon (in some instances) may not be directly copied onto the desktop. This icon must be assessed through Microsoft Explorer and then copied onto the Desktop.
2. In the "Capture Text" window, designate a Comma Separated Variable file by selecting a file path in the "file" window. For example, "*C/**WinNT**\profiles\username\Desktop\foldername\filename.csv*". In WinNT the login (the username) must be included in the file path in order for the file to be accepted.

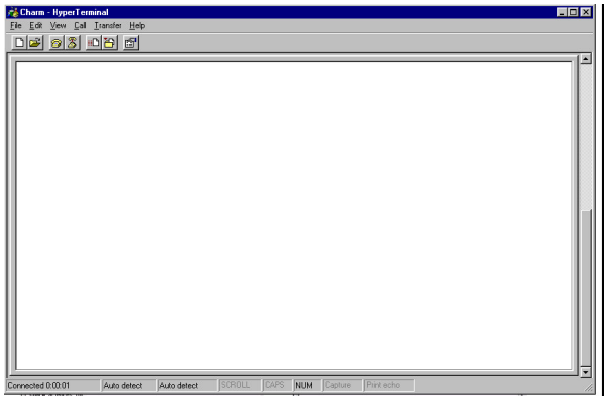
6. CUSTOMIZING THE LUMINATOR-T

Connect the analyzer to the black communications cable provided by Charm Sciences. Connect the other end of the cable to the serial computer adapter, and plug the adapter in to an available communications port on the back of the computer.

6.1 ESTABLISHING THE CONNECTION

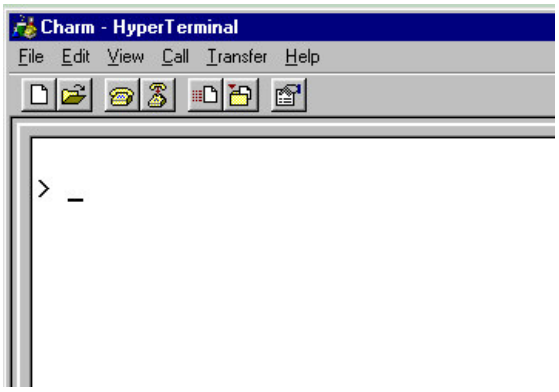
Double-click on the new icon on the desktop to open the established HyperTerminal connection. A blank white window will appear.





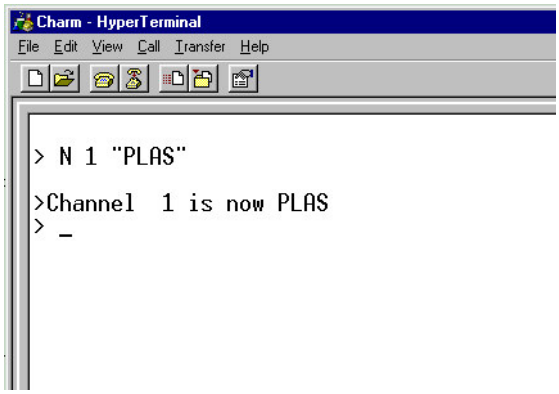
Turn on the connected analyzer. The HyperTerminal window should show a message with "Charm Sciences, Inc." and the LUM-T version number. *(If this text does not appear or if the error message "Unable to open Com 1" appears, follow the directions to* Change Communications Port, section 5.1.4.*)*

On the LUM-T, enter Remote Mode (option 6 on the Main Menu). A ">" symbol will appear in the HyperTerminal window.



6.2 RENAMING A CHANNEL

At the ">" prompt, hit ENTER once, then type in the letter N, a space, the number corresponding to the channel number to be renamed, a space and then the new name of the channel in quotes. The new channel name can be up to four characters long. A confirmation message will appear after the channel name is changed.



Close HyperTerminal and restart the LUM-T.

6.3 RENAMING THE "TEST" LINE

The third line of the Read screen display can be changed to any alphanumeric name up to five characters long: (for example, Oper#, Test#, Plant, Store, Dept#)

At the ">" prompt, hit ENTER once, then type in the letter N, a space, the number seven, a space and then the new name of the "Site" line. The new "Site" line name can be up to five characters long. A confirmation message will appear after the line is changed, saying that Channel 7 has the new name.

Close HyperTerminal and restart the Luminator.

6.3.1 To enable Multi-Site usage

The site number may either return to the last entered number after every test is run, or can reset to "1" before each test. To choose either of these options: From the Main Menu, select 3) Customer Settings, press Next. Select 1) Change Page Other, password is 4000. Set "Reset Test Num" to 000001 to have the number reset to "1" after each test; set "Reset Test Num" to 000000 to have the number remain the last entered number after each test. Press Enter and Esc.

6.4 RENAMING A LOCATION

In order to rename a location in the LUM-T, two settings need to be adjusted (from the analyzer menus). After these settings are adjusted as desired, connect the LUM-T to the computer to rename the desired locations.

6.4.1 Enable alphanumeric naming

From the Main Menu, select 3) Customer Settings, press Next. Select 1) Change Page Other, password is 4000. Set "Use Loc. Names" to be 000001 to enable alphanumeric naming. (Setting "Use Loc. Names" to be 000000 allows for numeric names only.) Press Enter and Esc.

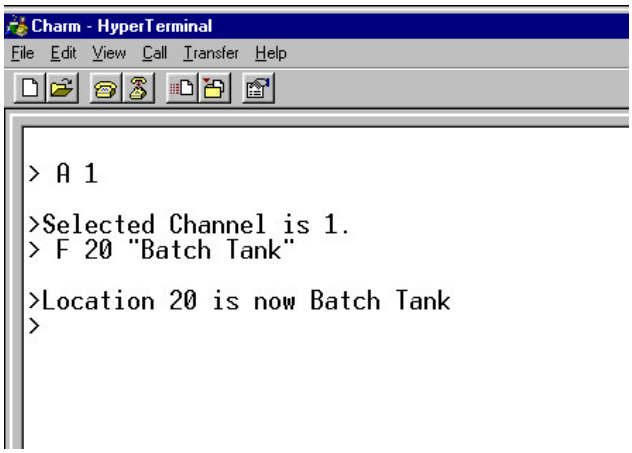
6.4.2 Choose Global or NonGlobal Locations

Up to 50 location names can be designated for each Channel on the LUM-T, or 300 location names universal to all six Channels. From the Main Menu, select 3) Customer Settings, press Next. Select 1) Change Page Other, password is 4000. Set "Global Locs" to be 000001 to have 300 location names universal to all Channels; set "Global Locs" to 000000 to have 50 location names specific to each channel.

6.4.3 Rename the Location

Connect the LUM-T to the computer. At the ">" prompt, hit ENTER once, then type in the letter A, one space and the number corresponding to the channel number with the location to be renamed. Press Enter. A message will appear confirming the selected channel.

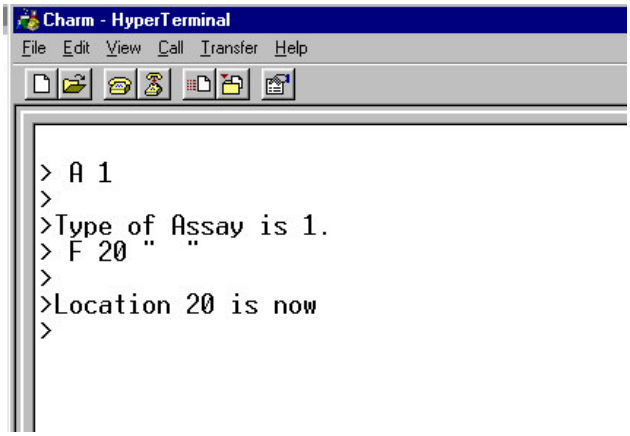
At the next ">" prompt, type the letter F, one space, the number (from 1-50) listing the location number to be renamed, one space, and the new location name in quotes. The new location name can be up to 12 characters long. A message will appear confirming the name change.


Charm - HyperTerminal
File Edit View Call Transfer Help
> A 1
>Selected Channel is 1.
> F 20 "Batch Tank"
>Location 20 is now Batch Tank
>

Close HyperTerminal and restart the Luminator.

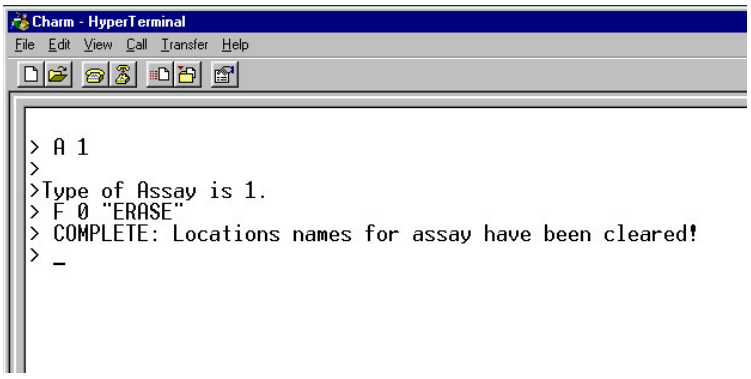
6.4.4 Deleting a Location

To delete a single Location name, follow the steps to Rename a Location, entering two spaces enclosed in quotes as the new location name.



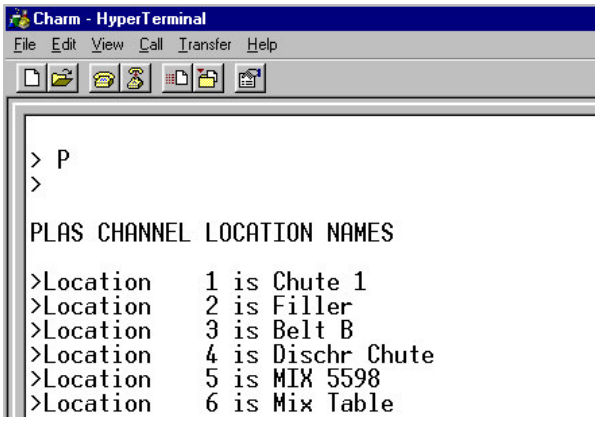
6.4.5 Deleting all Locations

To delete all Location names, follow the steps to Rename a Location, entering the location number as “0” and the word “ERASE” in as the new location name. A message will appear confirming that the erasure is complete.

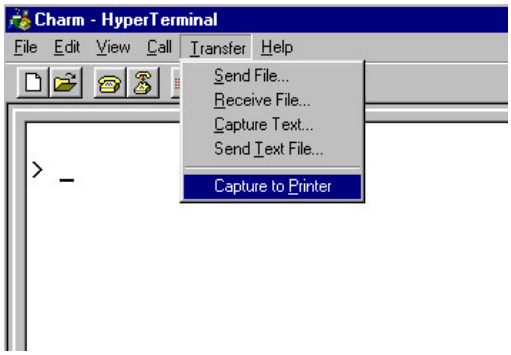

Charm - HyperTerminal
File Edit View Call Transfer Help
> A 1
>
>Type of Assay is 1.
> F 0 "ERASE"
> COMPLETE: Locations names for assay have been cleared!
> _

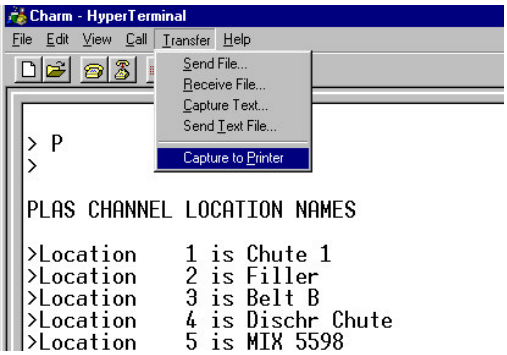
6.4.6 Printing all Locations

To print all Locations: at the “>” prompt, type the letter P. All channel and location names will list on the screen.


Charm - HyperTerminal
File Edit View Call Transfer Help
> P
>
PLAS CHANNEL LOCATION NAMES
>Location 1 is Chute 1
>Location 2 is Filler
>Location 3 is Belt B
>Location 4 is Dischr Chute
>Location 5 is MIX 5598
>Location 6 is Mix Table

*Note: to print out this list using HyperTerminal, go to the Transfer menu and select “Capture to Printer” **before** typing the P at the prompt. Once the names have appeared on the screen, turn off the “Capture to Printer” by selecting it again from the Transfer Menu. The check mark located to the left of the Capture option in the Transfer Menu will disappear when this setting is off. The location names should print after the Capture to Printer setting is turned off.*





7. CALIBRATION AND MAINTENANCE

7.1 OPERATING CONDITIONS

The Charm LUM-T analyzer and the PocketSwab Plus should be used and operated indoors. If operated in the presence of natural sunlight, interferences due to a reaction with the natural sunlight could occur. If PocketSwabs must be used in the presence of sunlight, place the swab in a dark environment and let sit for at least 1 minute before activating reagents.

7.2 CALIBRATION

The Charm LUM-T analyzer is factory calibrated. Customer calibration is not required. Calibration verification is recommended as part of a comprehensive quality assurance program to meet cGMP and HACCP regulations.

Charm luminometers are specifically designed and calibrated to measure luminescence and interpret pass/ fail from Charm PocketSwab single service swabs (PocketSwab Plus, CHEF test, WaterGiene, AllerGiene). Inserting swab devices other than those manufactured by Charm Sciences may lead to erroneous and invalid results.

An ATP Positive Control Tablet available from Charm Sciences may be used to make a positive control. The PocketSwab Plus is used to test the positive control for calibration validation of the LUM-T. This procedure not only validates the calibration of the analyzer but also verifies the performance of the PocketSwab Plus. A negative control (a PocketSwab Plus activated without swabbing a surface) is also run as part of the analyzer calibration validation. The two-point validation assures that the test and analyzer meet specifications for selectivity as well as sensitivity. The specification for a negative control is 0 RLU and the specification for a positive control is listed in the PocketSwab Plus operator's manual. It is recommended that positive and negative controls be run monthly or quarterly to verify calibration. More frequent verification may be required as part of a quality assurance system based on number of tests run (every 100 tests, for example), shift changes, daily or weekly operation.

If specifications are not met, Charm Sciences' Technical Support Department is available (see Troubleshooting) for immediate assistance. ATP Positive Control Tablets, PocketSwab Plus, and loaner LUM-Ts are available within 24 hours, if necessary.

ATP Positive Control Tablets may be purchased separately using order code ATP-POS-4 or ATP-POS-20 for 4 or 20 tablets respectively.

7.3 BATTERY

For optimum battery charge and life, recharge the battery only when the LUM-T displays "battery low recharge soon." Full recharge is completed in 2 to 4 hours. A power source of 120/240 Volt AC at 50/60 Hz is required to charge the LUM-T battery. A charged battery will power the LUM-T for up to 8-10 full hours of operation.

7.4 CLEANING

Avoid exposure to direct sunlight and any splashes or puddles. The LUM-T should be cleaned occasionally with a damp cloth, but do not use any harsh cleansers.

8. TECHNICAL INFORMATION

8.1 READING TIME

Seven seconds per analysis (5 second count + 2 second display refresh)

8.2 COMPUTER INTERFACE

RS232, 9600 baud, 8 bit data, no parity, 1 stop bit

8.3 DIMENSIONS/WEIGHT

Height: 9 inches; Width 3-5 inches; Depth 2.25-3 inches
2.5 pounds/1.15 Kg

8.4 POWER

Wall Mount Adapter – Wide Range
Input 100-240VAC, 50/60 Hz
Output 12 VDC Regulated, 2.5 Amps minimum, plug is center
Lithium memory battery
Nickel Cadmium rechargeable battery (2-4 hr recharge time, charge lasts 8-10 hours)

8.5 AMBIENT CONDITIONS

Operating temperature: 0°C to +50°C
Storage temperature: -20°C to +60°C
Humidity of atmosphere: 10 to 85%, non-condensing

9. TROUBLESHOOTING

Contact the Technical Services staff at Charm Sciences for any questions or concerns about the Charm LUM-T. 24-hour telephone support numbers are **(978) 687-9200**. E-mail Address: **support@charm.com**

If liquid spills into the sample chamber try drying with an absorbent swab and dry air from a hair dryer. After drying, count a negative control and run an instrument blank (press enter when no swab is in the sample chamber). Both results should be zero. Also run a positive control and make sure the RLU result is as expected. If problems continue, contact Charm Sciences.

If the initial RLU significantly decreases during the 5-second count there may be electrostatic interference from a very dry environment. Wipe the sample with a moist cloth before inserting into the LUM-T to count. If problems continue, it may be necessary to extend the count time. Contact Charm Sciences Technical Support for further instructions.

If charging LED indicators do not come on when the unit is plugged in, the internal battery or charging system may not be functioning. Contact Charm Sciences for instructions.

If the charging LED indicator blinks red, the rechargeable battery pack is not functioning and needs to be replaced. Contact Charm Sciences.

If the LUM-T will no longer hold a charge the internal NiCad rechargeable battery may need to be replaced. Contact Charm Sciences.

If the "Self-Check Error – Counting Subsystem" message appears when the LUM-T is turned on, the internal system checks determined the machine is malfunctioning. Plug the analyzer into the power cord and try turning it back on. If the message continues to appear, contact Charm Sciences.

If the LUM-T gives all zero results, even on positive controls or known positive samples, check that the reagents are within their expiration date and that they have been stored properly. Try reading the control on another calibrated channel. If problems persist, contact Charm Sciences.

If the LUM-T gives all high results, even on negative controls, check that the reagents are within their expiration date and that they have been stored properly. Make sure that the test is not being run in direct sunlight. Try reading the control on another calibrated channel. If problems persist, contact Charm Sciences.

If the LUM-T shuts off automatically and/or emits a **single long beep**, the battery needs to be recharged. Plug analyzer in to the 12V adapter and allow

time to recharge. *Note: tests may still be read on the analyzer while it is recharging.*

If a flashing "L_T" indicator appears in the upper right corner of the screen, the lithium memory battery needs to be replaced. Contact Charm Sciences immediately for further information.

If the Sample Guide breaks, contact Charm Sciences. Replacement guides are available, but often times a broken Sample Guide is an indication that the LUM-T has been dropped or mishandled and other parts of the analyzer may need repair.

If the "Warning Memory Almost Full" message appears, make sure all data is recorded, printed or downloaded, and then delete the memory. See Section 4.3.3.

If the "Error Memory Full" message appears, make sure all data is recorded, printed or downloaded, and then delete the memory. See Section 4.3.3.

10. WARRANTY

Charm Sciences, Inc. Limited Equipment Warranty

1. WARRANTY; LIMITATION OF REMEDIES: (a) Charm Sciences, Inc. ("Charm") warrants each equipment product to be free from defects in materials and workmanship and to be free from deviations from the specifications and descriptions of Charm's products appearing in Charm's product literature, based upon normal use. The warranty periods are, from the date of delivery:

Days from Date of Delivery	Warranty Coverage
1-30	New replacement unit, shipping
31-90	Parts and labor, shipping
91-180	Parts and labor
181-365	Parts only

Charm shall undertake to correct any such defects in material or workmanship that exist or appear during the warranty periods, provided, however, that Charm shall have no obligation or liability under this warranty unless Charm has been notified of such defect no later than thirty (30) days after such defect is first discovered and, in any case, no later than one year from the date the equipment is shipped to Buyer. Buyer will provide Charm with an opportunity to inspect and test the goods claimed to be defective. Remedial action under this warranty shall require only that Charm at Charm's option, repair or modify the equipment, or replace the same. (b) The foregoing provisions of this paragraph set forth and constitute Charm's sole obligation and liability and Buyer's exclusive remedy under this warranty. Charm's liability shall immediately cease if the seal is broken or the equipment is (i) subjected to accident, misuse, negligence, alteration, improper repair, servicing or maintenance, (ii) installed or used contrary to local, state or federal laws, codes or regulations, (iii) used contrary to Charm warnings, instructions or recommendations or contrary to the purpose or manner for which it was designed, or (iv) used with reagents other than those provided, sold or approved in writing by Charm. In addition, Charm will have no liability if the alleged breach of warranty is due to incomplete information supplied by Buyer or his representative to Charm or if the alleged breach of warranty is due to dirt, debris or other contamination of the equipment. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXCEPT TITLE, WHETHER STATUTORY, EXPRESS, IMPLIED (INCLUDING WARRANTIES FOR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE). Buyer represents that it alone has determined that the equipment purchased is suitable for and will meet the requirements of its intended use.

2. LIMITATION OF LIABILITY; INDEMNIFICATION: (a) Charm's liability on any claim of any kind, whether based in contract, warranty or tort (including negligence, failure to warn or strict liability) or otherwise, for any expense, injury, loss or damage arising out of, or connected with, or resulting from the design, manufacture, sale, delivery, resale, installation, inspection, repair, reconditioning, operation or use of any equipment, shall in no case exceed the contract price of that equipment. In no event shall Charm be liable for any special, indirect or consequential damages. (b) In the event the equipment is (i) subjected to abuse, misuse, alteration, improper repair, servicing or maintenance, (ii) installed or used contrary to local, state or federal laws, codes or regulations, (iii) used contrary to Charm's warnings, manuals or recommendations, or (iv) used with reagents other than those provided, sold or approved in writing by Charm, Buyer expressly agrees to defend, indemnify and hold Charm harmless from and against all claims, whether based in contract, warranty, or tort (including negligence, failure to warn, or strict liability), losses, expenses, damages, and liabilities which may arise out of the use or alleged use of the equipment to the extent caused by Buyer's negligence.

3. AMENDMENTS: The warranty provided herein may not be altered except by express written agreement signed by an officer of Charm. Representations, oral or written, which are inconsistent with this warranty are not authorized and if given, should not be relied upon.